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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/421,625 10/19/99 MARSH

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WELLS ST JOHN ROBERTS GREGORY AND MATKIN
SUITE 1300
601 W FIRST AVENUE
SPOKANE WA 99201-3828

EXAMINER

VU, H

ART UNIT

PAPER NUMBER

2811

DATE MAILED:

10/03/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

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Office Action Summary

Application No.

09/421,625

Applicant(s)

MARSH, EUGENE P.

Examiner

Hung K. Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 65-67, 74, 76 and 77 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 65-67, 74, 76, 77 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Applicants' communication filed 07/03/01 has been carefully considered by the examiner. The arguments advanced therein are persuasive with respect to the rejections of record, and some of those rejections are accordingly withdrawn. In view of a further search, however, a new rejection is set forth further below. This action is not made final.

Claim Objections

2. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claim 78 had been renumbered as 77.

3. Claim 76 is objective as dependent on a cancelled claim. Therefore, it would be cancelled.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 65-67 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki et al. (PN 6,033,953, of record) in view of Park et al. (EP 0855738A2, of record).

Aoki et al. discloses a capacitor comprising,

a substrate (1);

a roughened platinum layer (38) over the substrate, the roughened platinum layer having a continuous surface characterized by columnar pedestals;

an intervening layer (39) between the platinum layer and the substrate. Note Figures 1A-14 (especially Figures 1B-1D) of Aoki et al..

Aoki et al. discloses the intervening layer comprising titanium nitride. Aoki et al. does not disclose the intervening layer comprising at least one of iridium, rhodium, ruthenium, platinum, etc. However, Park et al. discloses an intervening layer (104), formed under a platinum layer (108), comprising at least one of titanium nitride, iridium, rhodium, ruthenium, platinum, etc.. Note Figures 1a-2c of Park et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the intervening layer of Aoki et al.'s comprising at least one of titanium nitride, iridium, rhodium, ruthenium, platinum, etc., such as taught by Park et al. because titanium nitride, iridium, rhodium, ruthenium, platinum, etc. are common used and interchangeable.

Aoki et al. and Park et al. disclose the substrate is a silicon substrate. Aoki et al. does not disclose the silicon substrate is monocrystalline. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the substrate of Aoki et al.'s

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and Park et al.'s by monocrystalline because it is convention to form an integrated circuit on a monocrystalline silicon substrate.

Although Aoki et al. and Park et al. do not teach the exact the thickness of the platinum layer and the height of columnar pedestals, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the platinum layer and the columnar pedestals of Aoki et al.'s and Park et al. having a desire thickness and height, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 66, Aoki et al. discloses wherein the pedestals terminate in dome-shaped tops.

With regard to claim 67, Aoki et al. discloses wherein the pedestals terminate in hemispherical tops.

5. Claims 74 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki et al. (PN 6,033,953, of record) in view of Liu et al. (PN 6,175,129).

Aoki et al. discloses a capacitor comprising,

A first capacitor electrode (38) over a substrate (1);

A second capacitor electrode (37);

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A dielectric layer (40) between the first and second capacitor electrodes;

Wherein the first capacitor electrode comprises a roughened platinum layer, the roughened platinum layer having a continuous surface characterized by columnar pedestals.

Note Figures 1A-14 (especially Figures 1B-1D) of Aoki et al..

Aoki et al. discloses the dielectric layer is a thicker layer. Aoki et al. does not disclose the dielectric layer is a thin layer. However, Liu et al. discloses a thin dielectric layer (54) between the first (46) and second (56) capacitor electrodes. Note Figures 1-10 of Liu et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the dielectric of Aoki et al.'s thin, such as taught by Liu et al., in order to increase the capacitance coupling between the first and the second capacitor electrodes. Note that because of the thin dielectric layer, the second capacitor electrode of Aoki et al.'s is inherent comprising a roughened platinum layer wherein the roughened platinum layer having a continuous surface characterized by columnar pedestals to increase the surface area.

Aoki et al. and Liu et al. disclose the substrate is a silicon substrate. Aoki et al. and Liu et al. do not disclose the silicon substrate is monocrystalline. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the substrate of Aoki et al.'s and Liu et al.'s by monocrystalline because it is convention to form an integrated circuit on a monocrystalline silicon substrate.

With regard to claim 76, Aoki et al. and Liu et al. disclose wherein the pedestals terminate in hemispherical tops.

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Response to Arguments

6. Applicant's arguments with respect to claim 65 and 74 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-5:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

September 28, 2001

Steven Loke
Primary Examiner

